

1.-Calcula y simplifica:

(1 punto)

$$(x-1)(x+2)x - (x+2)^3 =$$

2.-Dados los polinomios:

(3 puntos)

$$P(x) = x^4 - 2x^3 + 2x - 1$$

$$Q(x) = 2x^4 + 3x^3 - 2x^2 - 3x$$

Descomponlos en factores y halla su M.C.M. y su M.C.D.

3.- Simplifica la siguiente fracción algebraica:

(2 puntos)

$$\frac{x^4 - 1}{x^3 + x}$$

4.- Opera y simplifica:

(4 puntos)

$$a) \frac{x^2 - 1}{x} \cdot \frac{x^2 + x}{x^2 + 2x + 1} =$$

$$b) \frac{x^2 - 3x}{x + 2} : \frac{x^2 - 5x + 6}{x^2 - 4} =$$

SOLUCIONES

$$\begin{aligned}
 1.- (x-1)(x+2)x - (x+2)^3 &= (x-1)(x^2+2x) - (x^2+4x+4)(x+2) = \\
 &= x^3 + 2x^2 - x^2 - 2x - (x^3 + 2x^2 + 4x^2 + 8x + 4x + 8) = \\
 &= x^3 + x^2 - 2x - x^3 - 6x^2 - 12x - 8 = -5x^2 - 14x - 8
 \end{aligned}$$

$$2.- P(x) = x^4 - 2x^3 + 2x - 1$$

$$\text{Div}(1)=1, -1$$

$$\begin{array}{r|rrrrr}
 & 1 & -2 & 0 & 2 & -1 \\
 1 & 1 & 1 & -1 & -1 & 1 \\
 \hline
 & 1 & -1 & -1 & 1 & 0 \\
 1 & 1 & 1 & 0 & -1 & \\
 \hline
 & 1 & 0 & -1 & 0 &
 \end{array}$$

$$x^2 - 1 = 0 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$$

$$P(x) = (x-1)(x-1)(x-1)(x+1)$$

$$Q(x) = 2x^4 + 3x^3 - 2x^2 - 3x = x(2x^3 + 3x^2 - 2x - 3) \quad \text{Div}(3)=1, -1, 3, -3$$

$$\begin{array}{r|rrrr}
 & 2 & 3 & -2 & -3 \\
 1 & 2 & 5 & 3 & \\
 \hline
 & 2 & 5 & 3 & 0
 \end{array}$$

$$2x^2 + 5x + 3 = 0$$

$$x = \frac{-5 \pm \sqrt{25 - 4 \cdot 2 \cdot 3}}{4} = \frac{-5 \pm 1}{4} = \left\{ \begin{array}{l} -1 \\ -\frac{6}{4} = -\frac{3}{2} \end{array} \right.$$

$$\text{Luego } Q(x) = 2x(x-1)(x+1) \left(x + \frac{3}{2} \right)$$

$$P(x) = (x-1)^3(x+1)$$

$$\text{m.c.m.} = x(x-1)^3(x+1)(2x+3)$$

$$Q(x) = x(x-1)(x+1)(2x+3)$$

$$\text{M.C.D.} = (x-1)(x+1)$$

$$3.- \frac{x^4 - 1}{x^3 + x} = \frac{(x^2 - 1)(x^2 + 1)}{x(x^2 + 1)} = \frac{x^2 - 1}{x}$$

$$4.- a) \frac{x^2 - 1}{x} \cdot \frac{x^2 + x}{x^2 + 2x + 1} = \frac{(x+1)(x-1) \cdot x(x+1)}{x(x+1)^2} = x - 1$$

$$b) \frac{x^2 - 3x}{x+2} : \frac{x^2 - 5x + 6}{x^2 - 4} = \frac{(x^2 - 3x)(x^2 - 4)}{(x+2)(x^2 - 5x + 6)} = \frac{x(x-3)(x+2)(x-2)}{(x+2)(x-3)(x-2)} = x$$

$$x^2 - 5x + 6 = 0 \Rightarrow x = \frac{5 \pm \sqrt{25 - 24}}{2} = \frac{5 \pm 1}{2} = \left\{ \begin{array}{l} 3 \\ 2 \end{array} \right.$$